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ABSTRACT

This paper explains methods of handling information about real costs to develop a model that is then used to forecast future costs of specified distance education activities and to obtain funding for these activities. It is addressed to anyone concerned about acquiring and spending money in distance education--managers of systems and institutions, department heads, and people interested in the actual costs of activities. The paper takes the approach to funding distance education that involves identifying characteristics costs of distance education and funding it on the basis of costs. It explains methods of handling information about real costs, including variable and fixed costs and student numbers, to develop a model used to forecast future costs of specified distance education activities and to obtain funding for them. The procedure of building a bridge between the accounting system and funding costs analysis is described, a process that involves using allocation keys and a cost classification. (YLB)

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Funding and Spending: What Price Distance Education?

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FUNDING AND SPENDING : WHAT PRICE DISTANCE EDUCATION?

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Introduction

This paper is addressed to anyone concerned about getting and spending money in distance education, e.g. managers of systems and institutions, heads of departments and people interested in the actual costs of activities. It may be of interest to government officers and financial institutions concerned with allocating funds to distance education, e.g. for human resource and national development.

The paper follows a commonsense pragmatic approach. It is based on a two-year analysis of the costs of operating the New Zealand Correspondence School in an effort to establish an appropriate formula and process for the government to fund the school for adult continuing, secondary, primary, special and preschool distance education. It explains methods of handling information about real costs to develop a model which is then used to forecast future costs of specified distance education activities and to obtain funding for these activities.

Costs and Funding

Distance education is usually in the context of conventional face-to-face education and cost comparisons arise between the different forms. Governments in countries faced with meeting educational needs that outstrip resources such as buildings, equipment, number and quality of teachers, and finance are interested in both costs and quality of distance education. There are many types and forms of distance education differing in purpose, size, scope, media, entry requirements , levels and students so that it is difficult to compare costs between them or with conventional education. Articles by Snowden and Daniel, Rumble and Perraton deal with *costs* of distance education, mainly at tertiary level. There appears to be little information available about *funding* mechanisms for distance education.

Possible Approaches

Possible approaches to funding distance education include:

- Viewing distance education as an alternative method of delivering education and funding it on the same or a similar basis to conventional education, e.g. student numbers, hours, etc.
  As face-to-face education increasingly incorporates distance methods and blends with it, this approach eventually may be the simplest or most appropriate.
- Identifying characteristic costs of distance education and funding it on the basis of costs.
  Part of the appeal of distance education to planners is potential economies in delivering education. Governments and administrators may favour funding based on analysis of actual costs.

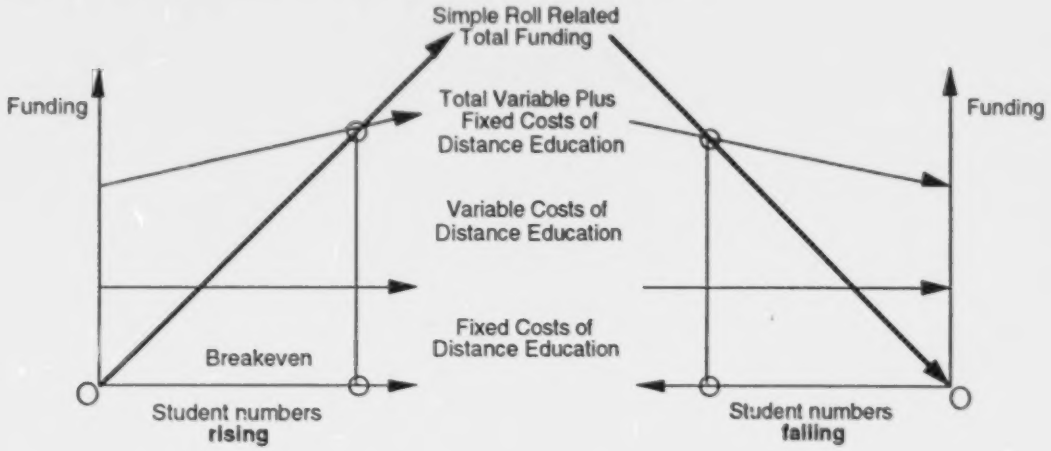
This paper takes the second approach. It is asserted that funding for distance education should be in terms of specific services bought or of outcomes purchased by the funding agency. Two important aspects are level of funding and yearly changes in funding factors that affect funding levels. The first approach may find favour with distance educators in large institutions with

growing rolls, but not in institutions with falling rolls or in small institutions with large preliminary costs of developing or purchasing course materials.

Establishing the Cost

Most distance education agencies teach many courses to various categories of students. Some also undertake a range of associated activities such as tutoring and student support or face-to-face vacation courses. Both managers and funding authorities are interested in the costs of particular activities. One method of establishing such costs is for all staff to keep time sheets and record their time in 10 minute or half hour units according to which activity they are engaged in, or which type of students' assignments for which course they are marking. This is a time consuming and laborious method, and the data collected requires processing and analysing.

The procedure proposed in this paper replaces such methods.



Two Models

1 It is possible for *each part of a distance education process to be administered by a separate agent,* or groups of parts may be administered by different agents. In this case a model based on costs appears appropriate.

Student enrolment and administration	→ Course teaching materials	→ Transmission network distribution and feedback	→ Assessment supplementary and teaching	→ Student support	→ Final assessment credits
Income fees and other funding	Cost of purchasing materials	Cost of using network or telecommunications, postage etc.	Cost of teacher times	Cost of student centres, services and support staff time	Cost of final assessment and qualification credit
$F	$C	$T	$A	$S	$Q

Net income to enrolling and administering courses is

$F - $(C + T + A + S + Q)

2 For an *institution that performs most of the processes.*
Costs are incurred by:

- *r* • student roll – distribution and management of materials, assessment, feedback and student support
- *d* • purchase or development and production of educational resources
- *s* • staff and institution related

p • property, plant and equipment
f • special factors peculiar to the institution, its students, charter responsibilities.

A funding formula could be:

$\$F = xr + yd + zs + vp + wf$

where x, y, z, v and w are numerical multipliers devised from analysis of past costs.

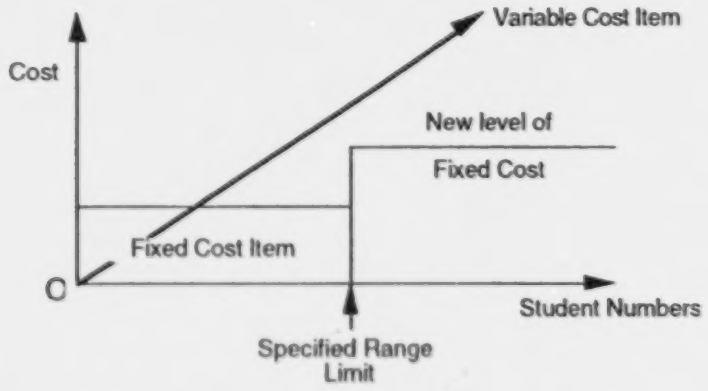
Items associated with each funding factor can be listed. Costs associated with each of these items for each factor can be identified, then total cost for each factor totalled. The total for all items of the roll factor r, will be xr. The roll r is then established by the chosen method and the multiplier, x, calculated by dividing xr by r. These factors and multipliers can be adjusted to reflect changes in quantities, spending patterns, policies.

When this analysis was undertaken it was found that the factors could be grouped and reduced to three: variable, fixed and special, with a formula:
$Funds = Variable Costs x EFTS + Fixed Costs + Special Factors

Variable and Fixed Costs

Costs were classified as:

- *variable* if the cost would change in direct proportion to changes in student numbers – these were mainly roll and staff related.
- *fixed* if costs remained constant with changes in student numbers within a specified range. If the quantity being costed moved outside this range the costs would increase in steps. It was also found that fixed costs were not likely to decrease. Examples of fixed costs were course development and maintenance, administration and buildings.
- *special factors* included Maori language factor and Board of Trustee costs.



The main factor in costs or deciding what funding to allocate to a distance education institution is student related, e.g. student roll, equivalent full-time students, assignments marked or outcomes such as course completions or student passes.

Costs were analysed for the six student groups listed above because the variable cost differed for each group and government wished to fund each separately. The Correspondence School has integrated school systems with similarities to Otto Peters industrial model.

Student Numbers

When counting student numbers decisions have to be made about:

- what is counted
- when it is counted.

As a result of the flexibility and openness of distance education students can enrol for courses of varying length and substance. This is particularly true for The New Zealand Correspondence School which in June 1993 taught 20,200 part-time and full-time students at six levels:

Primary	all education at a distance, aged 5-13	1270
Secondary:	all education at a distance, aged 13-18	1700
Adult Open Learning Service:	1 or 2 subjects part-time, aged 16 upwards	7900
Schools Open Learning Service:	1-5 subjects secondary dual enrolment, aged 13-18	7660
Special Education:	mainly dual enrolments, aged 0 upwards	1160
Early Childhood	aged 3 and 4	510

The Schools Open Learning Service students are enrolled at conventional secondary schools and study some subjects at a distance with The Correspondence School.

A roll count at any set date is a photographic snap shot and ignores roll changes and student turnover during the year which can be high in distance education - 33% in one section of The Correspondence School. Average roll over the year overcomes some of these objections. Cumulative yearly roll takes account of initial costs of enrolling and despatching. The latter two are retrospective measures. The favoured basis is equivalent full-time students (EFTS) determined by:

- the fraction of a full-time course the student studies
- time on the roll as a fraction of a year.

A proposed formula is:

$$\text{EFTS Total} = \sum_{1}^{k} \frac{\sum_{1}^{n} \frac{(C_f - C_s)}{7y}}{F(L)}$$

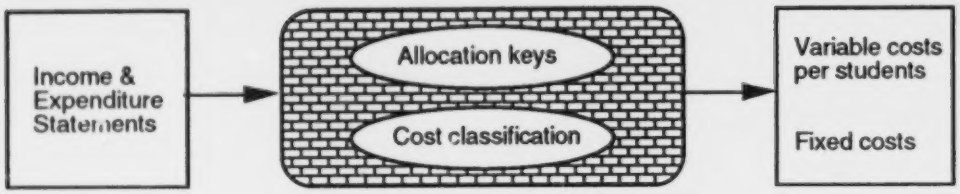
C_f = course finish date
C_s = course start date
y = length of school year in weeks
L = form level of the student
F(L) = no of courses constituting a full course at level L
n = no of courses each student takes
k = number of students enrolled

EFTS is also by definition a retrospective measure, but conversion factors can be established by analysing historical data so that estimates of EFTS can be made from a snapshot roll count and observable trends.

Other possible measures such as student assignments marked, course completions or numbers of student passes were considered and rejected.

Model and Procedure

A problem was that information available in the accounting system was not in the format and detail required for the funding costing, where it was necessary to identify costs for various groups of students. A bridge had to be built between the accounting system and funding costs analysis. This was done using allocation keys and a cost classification.



The funding costing framework

The information in the income and expenditure statements is the starting point in the analysis. This information is processed with the allocation keys and the cost classification which turns it into variable costs per students and total fixed costs for the school. In the final stage forecasted EFTS are processed to get the forecasted total funding for The Correspondence School

The funding costing was done in four steps:

1 *Identification of the Data Needed:* income and expenditure statements, statistical information and other information for the allocation keys.

2 *Allocation of Costs to Students:* in the six groups with the most appropriate allocation key. These costs were totalled and divided by the respective EFTS and the total cost per student for each group obtained.

3 *Classification of Costs:* variable and fixed, or apportionment between these categories. Examples:

Expenditure Item	Variable/Fixed	% Variable	% Fixed
Telecommunications			
– rental	Fixed		100%
– charges	V & F	97%	3%
Postage	Variable	100%	
Staff Travel	Variable	100%	
Textbooks	Variable	100%	

4 *Cost Analysis:* The end result was a variable cost per student for each of the six student groups and a total fixed cost for the whole school. These costs were then used to calculate *funding* requirements based on new EFTS numbers in the future.

Cost Allocation Keys

These were used to break down the total costs of the whole school into the six student groups. As each cost was identified an appropriate allocation key was assigned, e.g. the cost of the daily 20 minute national radio broadcast was proportionally allocated to each student group using total annual minutes per student group as the allocation key. Where there was no reasonable allocation key for a particular cost EFTS was used. Information on the allocation keys was assembled from various sources, mostly from the extensive data base in the School Information System. Some other examples of allocation keys were staff numbers, adjusted teacher time usage, and student numbers.

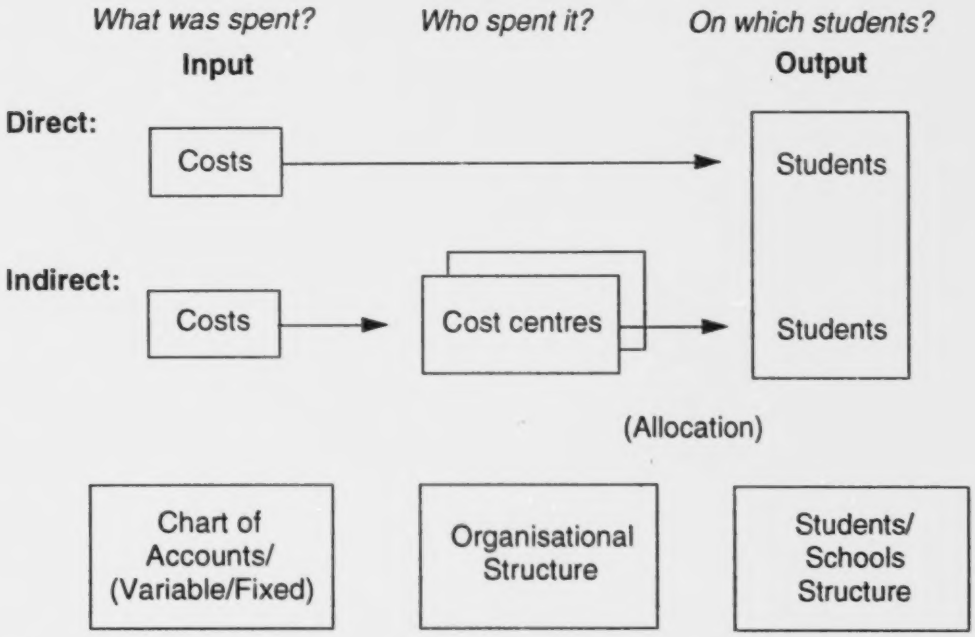
Examples:

Operating Expenditure Item	Allocation	Cost Allocation Key
Bank Fees	No	-
Fuel and Power	Yes	Staff numbers
Postage	Yes	EFTS

Accounting System Requirements

The financial accounting system shows the type of costs and where in the school it was spent, but it does not show for or on which students it was spent. In theory it should be easy to design an accounting system that will also show student or output element of costs, but it is rare to find a straightforward relationship between costs and students. For example one teacher may teach students from different groups in different courses at different levels.
To identify costs for students an accounting system can be designed.

Framework for an accounting system



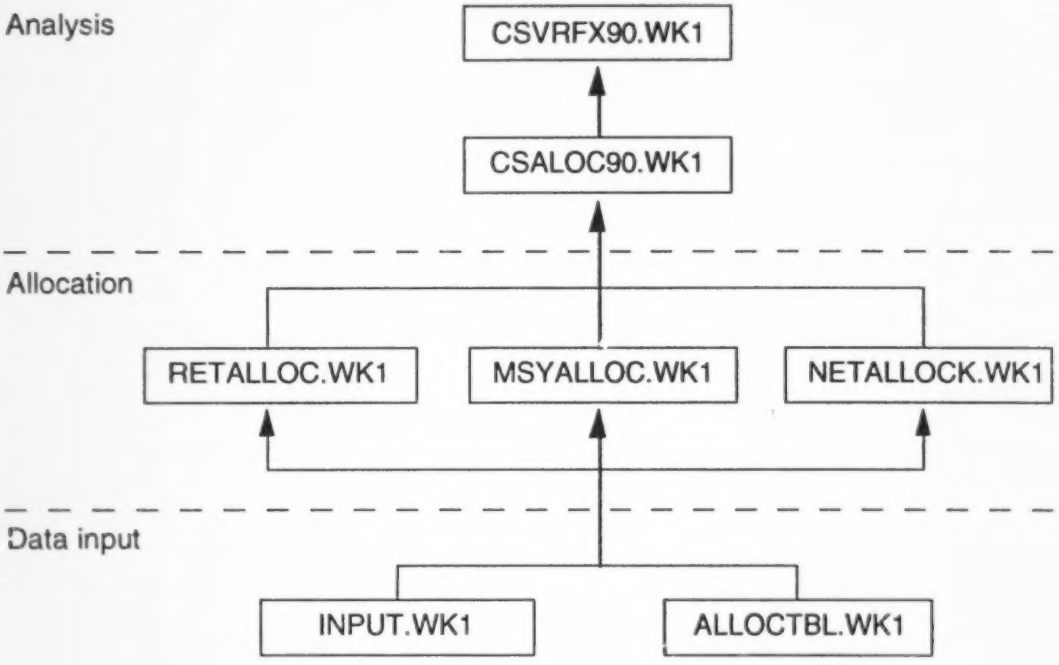
Costs need to be identified according to both organisational structure and students.
This can be done either by coding the costs *directly* to the students if this is possible, or *indirectly*, by first coding the costs to a cost centre and then allocating them to the students with appropriate allocation keys.

The chart of accounts will show the type of expenditure and will classify costs as variable and fixed. The organisational structure will show where in the school the money was spent, and the students/schools structure will show for which students the money was spent. In The

Correspondence School financial accounting system the costs are only coded to cost centres. The funding costing was an attempt to create the link to the students by using allocation keys.

Software and hardware used

The funding costing was done in Lotus 1-2-3 version 2.2 on an IBM compatible PC. The computer model was designed to facilitate changes to the figures and to make all the necessary calculations automatic once the original data was input. This was achieved by using special features of the software such as file linking and logical @IF statements. There are seven different spreadsheets, two which are for data input of financial information and the allocation keys, and five which are for cost allocation, classification and the analysis. The hierarchical structure of these spreadsheets is shown in the graph below.



The lotus 1-2-3 files in the funding formula

Funding

To obtain future funding The Correspondence School will agree on estimates of student numbers in each of the six student categories with the Ministry of Education, and then convert these numbers to EFTS. We will then apply for funding to provide a particular teaching service to this number of students. This application will contain objectives in the form of statements of service performance which will be negotiated and the Ministry of Education will fund or purchase specific services from The Correspondence School. This funding will be on the basis of actual verified student costs which can be compared favourably with costs of conventional face-to-face education. The school is then bulk funded and may deploy and use these funds according to Board policy and management and staff decisions.

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COST ANALYSIS FOR THE CORRESPONDENCE SCHOOL

Period 1991

CS Total Allocated Costs $NZ	Primary	Secondary	Adult OLS	Schools OLS	Special Education	Early Childhood	Div Total
Variable Operating Expenditure	1 715 608	2 726 577	4 547 512	2 237 086	1 457 652	453 907	13 138 342
EFTS	1 156	1 415	4 448	2 031	1 004	510	10 564
Variable Costs Allocated per EFTS	1 484	1 927	1 022	1 101	1 452	890	1 244
Variable Costs Not Allocated Direct (Allocation based on EFTS)	217	217	217	217	217	217	217
Total **Variable** Costs Per EFTS (excluding Goods & Services Tax)	1 701	2 144	1 240	1 319	1 669	1 107	1 461
GST Per EFTS, 12.5%	213	268	155	165	209	138	183
Total **Variable** Costs Per EFTS, incl GST	1 914	2 412	1 394	1 483	1 878	1 246	1 643
Total **Variable** Costs, incl GST	2 212 451	3 413 061	6 202 524	3 012 862	1 885 119	635 231	17 361 247

FIXED Costs, excl GST	12 966 898
Fixed GST 12.5%	1 620 862
Total **Fixed** Costs, incl GST	14 587 760
Total FIXED Costs Per EFTS, incl GST	1 381
TOTAL VARIABLE & FIXED COSTS, incl GST	31 494 007